SYMONS'S
MONTHLY
METEOROLOGICAL MAGAZINE.

CCCCXIX.] DECEMBER, 1900. [Price Fourpence, or 5s. per ann. post free.

MEMORIAL TO THE LATE G. J. SYMONS, F.R.S.

As mentioned in our June issue, a number of friends of the late G. J. Symons, as widely as possible representative of the various societies with which he was connected, met at the rooms of the Royal Meteorological Society, at the invitation of the President, on May 31st last, to consider the best means of raising a permanent Memorial in commemoration of the services rendered to his country by the founder of the British Rainfall Organization.

An Executive Committee was formed, invited subscriptions, and has received a hearty response. At a recent meeting of this Committee it was resolved to close the lists shortly, and the following letter was sent out to the Press.

We have much pleasure in printing it as a reminder, in case the matter has slipped the memory of any of our readers. For we are sure that in this Magazine, which he conducted for so many years, it is needless to say a word in support of the proposal.

To the Editor of the Meteorological Magazine.

Sir,—On May 31st a meeting was held at the rooms of the Royal Meteorological Society, to consider the question of a Memorial to the late Mr. G. J. Symons, F.R.S., the distinguished Meteorologist, and Founder of the British Rainfall Organization.

It was resolved unanimously that the Memorial should take the form of a Gold Medal, to be awarded from time to time by the Council of the Royal Meteorological Society, for distinguished work in connection with Meteorological Science.

An Executive Committee was appointed, to take the necessary steps to raise a fund for that purpose. We have now much pleasure in stating that their appeal has been very heartily responded to; not only by meteorologists, engineers, and representatives of other branches of science and industry, but also by personal friends and admirers of the late Mr. Symons in all classes.

The Committee have decided to keep the list open until the end

of January, 1901, in order to allow all who have in any way benefited by Mr. Symons' advice and assistance to contribute to the Memorial Fund.—Yours faithfully,

C. THEODORE WILLIAMS, M.D., *Treasurer.*
R. MELDOLA, F.R.S., } *Secretaries.*
WM. MARRIOTT, }

70, Victoria Street, Westminster, S.W.

A CLASSIFICATION OF FIFTY-NINE WINTERS.

To the Editor of the Meteorological Magazine.

SIR,—Perhaps the following classification of winters at Greenwich according to the number of frost days in the second half of the year and the first half following, might interest some of your readers. (Winters are designated by the year in which they *end*; thus, '42 means 1841-42.) The averages are 18 for the second half-year and 37 for the first half.

1. *Both halves cold* (*frost days* OVER *average*):—
   '42, '45, '47, '50, '52, '55, '57, '60, '65, '70, '75, '76, '79, '81, '86, '87, '88, '91 ... ... } 18
2. *Both halves mild* (*frost days* UNDER *average*):—
   '43, '44, '46, '48, '49, '51, '62, '63, '66, '69, '73, '74, '77, '78, '82, '83, '84, '94, '96, '98, '99... ... ... } 21
3. *Second half average, first half cold*:—
   '89 1
4. *Second average, first mild*:—
   '59, '61, '97, 1900 4
5. *Second average, first average*:—
   '67 1
6. *Second cold, first mild*:—
   '54, '56, '68, '71, '72, '80, '90, '93... 8
7. *Second mild, first cold*:—
   '53, '58, '64, '85, '92, '95 6

59

We may note that winters in which both halves are alike (either cold or mild) are nearly three times as numerous as those in which they are opposite. The 11 winters '42 to '52 were all in the former category, also the 12 winters '73 to '84, with one exception ('80).

Yours faithfully,

A. B. M.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE FOR THE YEAR 1899.

THE Annual Summary of our Monthly Climatological Tables has been crowded out month after month, and now we have room to comment on it but very briefly. Only one station has had to be omitted for non-arrival of returns, the December table for Trinidad having failed to reach both us and the Royal Meteorological Society. Jamaica and Esquimalt are absent on account of cessation of the observations, but for Jamaica another record has become available.

The extremes set out in the Summary are accredited to much the same stations as usual, and it is difficult to do justice to them in any brief reference, when obviously a volume might be written on a quarter of a century's records at any one of the stations. The max. temp. at Adelaide (113°·6 on February 12th) has only once been exceeded in our tables at that station—viz., by 114°·2 in 1876, while, curiously enough, four days earlier Winnipeg was experiencing an exceptionally low temp (—46°·5 on February 8th), but a reading 4°·0 lower was recorded in 1879. At Adelaide the max. in sun (175°·7) is also unusual, 180°·0 in 1882 being the only higher reading.

The greatest rainfall (73·52 in. at Colombo), though by no means exceptional for that station, is the lowest value that has ever claimed entry in one of our annual summaries as the maximum for the year, the next lowest max. being 73·79 in. at Trinidad in 1889.

The maximum amount of cloud (5·7 at Mauritius) also is the lowest in any of our summaries, the lowest previously being 6·3 in 1886, 1892, and 1894, but in all these years the max. occurred at another station. This extreme has several times been recorded at London, but the 1899 cloud value for that station (5·6) is low, only three out of the preceding 40 years having been less cloudy.

SUMMARY.

Highest Temp. in shade	113°·6 at Adelaide on Feb. 12th.
Lowest „ „	— 46°·5 at Winnipeg on Feb. 8th.
Greatest Range in year	135°·9 at Winnipeg.
Least „ „	21°·0 at Grenada.
Greatest Mean Daily Range ...	22°·3 at Winnipeg.
Least „ „ „ ...	9°·4 at Grenada.
Highest Mean Temp.	81°·9 at Ceylon, Colombo.
Lowest „ „	34°·2 at Winnipeg.
Driest Station	Adelaide, mean humidity 59.
Dampest Station...	Ceylon, Colombo, mean humidity 79.
Highest Temp. in Sun	175°·7 at Adelaide.
*Lowest Temp. on Grass**	— 16°·5 at Toronto.
Greatest Rainfall	73·52 in. at Ceylon, Colombo.
Least Rainfall	17·87 in. at Malta.
Most Cloudy Station	5·7 at Mauritius.
Least Cloudy Station	2·3 at Grenada.

* The min. on grass is not recorded at the other Canadian stations.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE FOR 1899.

STATIONS. *Those in Italics are South of the Equator.*	ABSOLUTE. Maximum. Temp.	Maximum. Date.	Minimum. Temp.	Minimum. Date.	AVERAGE. Max.	Min.	Mean.	Dew Point.	Humidity.	ABSOLUTE. Max. in Sun.	Min. on Grass.	TOTAL RAIN. Depth.	Days.	AVERAGE. Cloud.
	°		°		°	°	°	°		°	°	in.		0—10
England, London ...	91·2	August 15	19·9	March 21	60·1	43·7	51·9	43·7	77	136·4	15·8	22·54	144	5·6
Malta	94·6	July 25	43·2	January 7 & 8	72·7	59·5	66·1	56·9	77	151·6	35·5	17·87	79	2·7
Cape of Good Hope.	98·1	December 15	36·1	May 26	71·0	53·5	62·3	51·8	76	...	...	26·80	88	3·9
Mauritius	87·4	February 9	55·0	June 18	79·3	68·9	74·1	65·0	76	163·8	48·1	42·82	203	5·7
Calcutta	105·4	April 29	44·4	January 20	87·7	70·3	79·0	68·5	73	158·6	34·8	71·95	98	4·5
Bombay	93·7	October 21	59·1	January 7	86·3	75·2	80·7	71·2	73	141·3	51·9	35·90	87	3·3
Ceylon, Colombo ...	93·7	February 28	67·5	January 8	88·6	75·2	81·9		79	157·5	65·5	73·52	152	...
Melbourne	104·2	December 31	30·6	July 20	67·6	49·3	58·5	47·3	71	156·9	25·2	28·87	116	5·5
Adelaide...	113·6	February 12	35·6	July 27	72·9	52·8	62·8	46·5	59	175·7	25·4	18·85	119	4·5
Sydney	102·1	December 1	38·8	August 10	69·8	56·6	63·2	...	...	158·5	27·8	55·91	172	4·8
Wellington	76·3	Jan. 1, 2, 6	31·0	July 15, 26	61·0	48·6	54·8	45·2	71	141·0	23·0	52·73	177	4·4
Auckland	84·5	February 17	37·0	July 26	64·9	52·7	58·8	48·8	70	144·0	31·0	34·44	149	5·0
Grenada	88·8	September 7	67·8	February 16	83·1	73·7	78·4	70·0	73	155·4	...	64·29	208	2·3
Toronto	92·1	August 19	—12·6	February 11	54·6	37·5	46·0	39·9	76	114·0	—16·5	28·99	147	5·6
New Brunswick, Fredericton.....	87·7	July 2	—16·8	January 2	51·2	29·9	40·6	30·0	63	...	...	38·85	121	5·2
Manitoba Winnipeg	89·4	July 22	—46·5	February 8	45·4	23·1	34·2	...	...	...	...	19·81	92	5·5

ON SOLAR CHANGES OF TEMPERATURE AND VARIATIONS IN RAINFALL IN THE REGION SURROUNDING THE INDIAN OCEAN.*

IT is impossible to cut this important paper down to the amount of space available, without practically destroying it, and we would strongly urge all our readers interested in the subject, to get the numbers of *Nature*, for November 29th and December 6th, and study it carefully by the aid of the diagrams there given. We can only cull a few more or less disjointed paragraphs as to rainfall, indicative of the substance of the paper, leaving out all reference to the spectroscopic results.

"The fact that the abnormal behaviour of the widened lines in the spectra of sunspots since 1894 had been accompanied by irregularities in the rainfall of India, suggested the study and correlation of various series of facts which might be expected to throw light upon the subject."

"It has been found, from the actual facts of rainfall in India (during the S.W. monsoon) and Mauritius, between the years 1877 and 1886, as given by Blanford and Meldrum, that the effects of these solar changes are felt in India at sunspot maximum, and in Mauritius at sunspot minimum. Of these the greater is that produced in the Mauritius at sunspot minimum. The pulse at Mauritius at sunspot minimum is also felt in India, and gives rise generally to a secondary maximum in India."

"India, therefore, has two pulses of rainfall, one near the maximum and the other near the minimum of the sunspot period."

"It has been found from a study of the Famine Commission reports, that all the famines therein recorded, which have devastated India during the last half-century, have occurred in the intervals between these two pulses."

"It has been found, from an investigation of the Nile curves between the years 1849 and 1878, that all the lowest Niles recorded have occurred between the same intervals."

One of the diagrams referred to gives the annual rainfall at Cordoba, Cape, Bombay, Mauritius, and Batavia, from 1873 to 1896, compared with the sunspot changes, and although the agreement can scarcely be called convincing, it is sufficient to strongly support the theory of interdependence, the chief doubt suggested to the meteorologist who has seen weather cycles innumerable proved to the satisfaction of their authors, being whether equal agreement would be shown if the period could be considerably prolonged. But the possible prediction of Indian famines is a matter of such vast importance that any serious attempt to throw light upon it should be heartily welcomed.

---

* By Sir Norman Lockyer, K.C.B., F.R.S., and W. J. S. Lockyer, M.A., Ph.D. Paper read before the Royal Society on November 22nd.

As long as the study of meteorology was practically confined to Europe and the temperate regions, where the main phenomena are almost entirely masked by the variations, the advance was naturally slow, but the more recent attempts to correlate the phenomena of distant regions, as instanced by the comparison of Indian and Mauritius Rainfall and Nile floods, are most hopeful, and if the International Meteorological Committee succeeds in establishing observatories at the centres of action of the atmosphere, as proposed by Prof. Hildebrandsson, the probability of rapid advance in the early future seems assured.

REVIEWS.

Mémoires originaux sur la circulation générale de l'Atmosphère :—Halley, Hadley, Maury, Ferrel, W. Siemens, Möller, Oberbeck, von Helmholtz. Annotés et commentés par MARCEL BRILLOUIN. Paris : Carré et Naud. 1900. Pp. xx. + 164.

THIS is a collection of translations into French of a number of papers originally written in English or German by the meteorologists and physicists whose names appear in the title. The memoirs all deal with the theoretical circulation of the atmosphere as a whole on a smooth globe of uniform surface, and they show how the influence of the rotation of the earth has been gradually recognised as of paramount importance in determining the direction of the wind currents. M. Brillouin in his introduction gives prominence to the necessity of taking account of the difference between land and sea surfaces in applying to actual circumstances the theoretical considerations with which the various authors deal. In this connection he calls special attention to the views of M. Maurice de Tastes.

By Land and Sky. By the REV. JOHN M. BACON, M.A., F.R.A.S. Isbister and Co. 1900. 8vo. 275 pages, 4 illustrations.

THIS book is essentially scientific, for it adds to our stores, knowledge gained direct from Nature, practically without the intervention of instruments, and, unlike so many modern scientific works, which are a weariness to the flesh, it does not contain from beginning to end an algebraical formula or even a table of figures, and from cover to cover there is not a sentence which the man in the street, if intelligent, could not understand. It suggests the important question, whether science would not have less cause to complain of lack of recognition in England if our leading scientists had more often attempted to make their writings comprehendable by a larger public instead of addressing only the learned few.

The author set himself the task of studying from Nature and not in the laboratory, the anomalies of sound, primarily in connection

with the failure at times of sound signals to prevent accidents at sea. The work is a narrative of questions put to Nature on the subject in many ways, but more especially from balloons. The author makes many references to Glaisher, the father of scientific ballooning, and his work reminds us strongly of the well known "Travels in the Air," in its sustained interest.

The Meteorological element of the work consists in the descriptions of the effects of different strata of air of varying density and temperature on the conveyance of sound, and the author's observations disprove the commonly accepted idea that fog is essentially a bad conductor of sound. He says—"A uniform quiescent fog may offer no obstruction to sound whatever, while, on the other hand, rolling masses of fog of varying temperature and density may impede sound waves or even reflect them."

ROYAL METEOROLOGICAL SOCIETY.

The first meeting of this society for the present session was held on Wednesday evening, November 21st, at the Institution of Civil Engineers, Dr. C. Theodore Williams, the President, being in the chair.

The Foreign Secretary (Dr. R. H. Scott) read a letter from Prof. Hildebrandsson, of Upsala, stating that the International Meteorological Committee invited observations of the form, amount, and direction of the clouds on the first Thursday of each month during 1901, as well as on the preceding and following days. These cloud observations are to be made in connection with the balloon ascents which will be carried out under the direction of the Aerostation Committee.

Mr. R. H. Curtis read a paper on "An Improved Mounting for the Lens and Bowl of the Campbell Stokes Sunshine Recorder." It has been generally supposed that the sunshine recorders are sent out by the makers ready for use, and a purchaser does not expect to have to examine them for a possible error in the size of the bowl, affecting the time scale of the record, or in the burning of the lens, affecting its amount. Mr. Curtis states that in the majority of instances they fail in one or more of these respects, and, unfortunately, there has not hitherto been provided a ready means of detecting an error, or of remedying it if found to exist.

The improvement consists, first, in giving to the pedestal which carries the lens a simple sliding movement in two directions, at right angles to each other, and also a vertical movement; and by means of these three movements it can be quickly and accurately placed centrally in the bowl, where it is secured by a couple of clamping screws. Secondly, the bowl itself is mounted so that it can be moved through a small arc, sufficient to accommodate it to

the latitude of the station; without the rather clumsy device of tilting the base, which in practice is not only a clumsy but also a rather troublesome adjustment to make.

It has been a point kept in view to have all these movable parts substantially made, so that the adjustment of the instrument being once made no further trouble need be feared from slipping or weakness.

The latitude adjustment of the bowl, and the adjustment of the lens within the bowl, are of course made before the instrument is taken to the site chosen for it. All that then remains to be done is to secure for it a level base, and to place the recorder upon that base correctly adjusted to the meridian of the station.

Mr. F. C. Bayard thought that in a gale of wind the glass ball was liable to be blown out of the frame, and broken, and suggested that some means of preventing this might be adopted.

Mr. W. Marriott, after describing the method which he employed for testing the sunshine recorders in use at the stations of the Society, stated that a few years ago it had been found that the glass ball of the Greenwich sunshine recorder had deteriorated, and consequently registered too little sunshine. He had recently come across another instance of the same thing, in the recorder at Regent's Park. This instrument he exhibited to the meeting; and it was quite apparent that the glass ball had become very dull, and that its definition was indistinct.

Mr. E. Mawley and Mr. F. J. Brodie having described their experiences as to the adjustment of the recorders, Mr. R. H. Curtis, in reply, said that he did not think that the strength of the wind was sufficient to blow the ball out of the frame. He urged that when put into proper adjustment, the frame of the recorder should be firmly fixed, so as to prevent any shifting.

Mr. W. H. Dines read a paper on the "Weekly Death Rate and Temperature Curves, 1890 to 1899." The death rate used was that of the thirty-three large towns of England; and the temperature was that of Greenwich. Temperature is the most important

meteorological element which affects health; and in the author's opinion, no other, save fog, has an appreciable effect.

There were several points of interest about the curves. The influenza epidemics were plainly shown, notably those of January, 1890, May, 1891, January, 1892, and March, 1895, but seem to be independent of weather conditions. Mr. Dines is inclined to attribute the high death rate of January, 1891, to fog, although it may be due to cold. This was the date of the long frost, but then the equally severe and long frost of January and February, 1895, was accompanied by a low death rate, the rise in which, caused by influenza, occurred just before the break-up of the frost. In January, 1891, fog was very prevalent, and the death rate, though high in the towns, was not so in the country. In 1895 the weather conditions were different, and strong winds and bright sunshine prevailed during the severe weather.

The curves of the last four years of the series differed from the others, the maxima occurring in the summer. This was doubtless due to the high temperatures that prevailed. The ordinary summer maximum, shown by the dotted line, comes in the middle of August, the rise commencing in the beginning of July. It was seen that when the summer is a cold one, as in 1890, 1891, 1892, and 1894, the summer rise is delayed and is unimportant; but when the summer is a hot one, as in 1893, 1896, 1897, 1898, and 1899, it is very prominent, the crest just reaching or surpassing the 25 per thousand level. But this is not all; in the hot summers in which the heat occurs in the early part, as in 1893 and 1895, the highest death rate occurs before its usual time; on the other hand, in the years in which extreme heat comes towards the end of the summer, as in 1898 and 1899, the maximum comes later than usual.

The author is of opinion that from the health point of view, the English climate is one of the best in the world, and this is proved by the relatively low rate (19·7) shown in these curves. A more pleasant climate may well be found, but the majority of the health resorts which Englishmen frequent in the winter have a higher death rate than London has at the same season, and a far higher rate than any of the country districts of the British Isles.

Surgeon-Major Black called attention to the increased mortality of infants in summer, and of old people in winter. He also referred to the influence of personal hygiene, *e.g.*, clothing, food, &c.

Mr. F. J. Brodie agreed with Mr. Dines that cold winters were not necessarily unhealthy unless accompanied by fog. He could trace no connection between influenza and the weather.

Mr. W. Marriott thought that Mr. Dines would have obtained better results if he had confined his discussion to London only, rather than grouping together the death rates of the 33 large towns of England, and comparing the result with the temperature at Greenwich.

The President (Dr. Theodore Williams) said that many factors

had to be taken into consideration in dealing with the death rate, besides the weather. He mentioned three, viz.—strikes, which occasion greater poverty; the greater consumption of fruit in a hot summer; and imperfect drainage. He was a great admirer of the English climate. Its great changes, no doubt, caused much illness, but not a high death rate. People left England in winter not only for the sake of their health, but to obtain more sunshine and the greater enjoyment of open air life. The healthiness of this country was no doubt due to its better sanitary conditions, for, with the possible exception of America, they were more perfect than in any other country, and sanitary conditions had more to do with the death rate than weather.

Mr. Baldwin Latham said that he had found, from experience, that it did not do to take large areas in tabulating health results, owing to the great variety of conditions spread over a large area. He referred to the enormous number of deaths of children in London, in summer, from diarrhœa, and said that the rise in the death rate from this complaint in the districts supplied by the Kent Water Company, from the chalk, took place a fortnight later than in the districts supplied by the Thames Water Companies. This was no doubt owing to the water from the former being much colder in starting through the mains, and took longer to become heated than that from the Thames, which started at a high temperature through the mains. Percolation also played an important part in influencing the death rate, and should be taken into consideration.

Mr. W. H. Dines, in reply, said that, speaking generally, a hot or cold period at Greenwich was also a hot or cold period over England. He had preferred to take the death rate of the 33 large towns, because the various factors mentioned by Dr. Williams were thus largely eliminated.

The following new Fellows were elected:—Mr. F. March, Miss F. E. A. P. Parker, Mr. A. H. Waller, Mr. B. R. Williams, and Mr. C. A. Woolnough.

A WET AUTUMN IN EDINBURGH.

(Reprinted from the "Scotsman.")

THE most striking feature of the meteorology of Edinburgh since the beginning of October has been the excessive and quite unprecedented rainfall, and the almost complete absence of spells of fine weather, which are not unfrequently experienced in the autumn months. The excessive rainfall of October—the wettest in Edinburgh since 1864—has been followed by an even more remarkable downfall in November, which seems to have been the rainiest since the year 1772. In the Newington district 10·29 in. of rain fell in the two months under review, while at Leith the precipitation was a third of an inch less, or 9·92 in. For the purpose of comparison we have rainfall observations made in Edinburgh from 1770 to 1776, for the year 1780, and again from 1785 down to the present time, or 124 years in all. Reference to these tables of

monthly rainfall shows that on no previous occasion has the downfall for the two months under consideration amounted to ten inches. The following are the instances in which eight inches or more was precipitated during October and November:—

Year.	October. Inches.	November. Inches.	Total Inches.
1771.....	5·59	3·76	9·35
1772.....	3·51	5·66	9·17
1775.....	5·31	3·62	8·93
1789.....	3·46	5·21	8·67
1794.....	3·58	4·46	8·04
1795.....	4·87	4·58	9·45
1824.....	4·73	4·38	9·11
1864	6·90	1·79	8·69
1900.....	4·87	5·42	10·29

It is possible that, had returns been available for 1778, they would have indicated a heavier rainfall for the two months than in 1900. From an old register I find that the rainfall at Peebles in 1778 was 5·54 inches in October and 5·66 inches in November, a total for the two months of 11·20 inches, while the corresponding values at Dumfries were 6·74 inches and 5·50 inches—an aggregate of 12·24 inches. But it is, of course, unsafe to assume that the rainfall in Edinburgh would have been as large as at the two inland places.

In order to ascertain the distribution of the rainfall last month in the Edinburgh district the following returns, kindly supplied by several local observers, may be of interest, indicating as they do the somewhat capricious manner in which this element of climate varies even within narrow limits.

	Ins.		Ins.
Edinburgh—		Swanston	5·53
Napier Road	5·38	Corstorphine	5·15
Royal Observatory	4·60	Colinton	5·61
City Observatory	5·18	Davidson's Mains	4·78
Blacket Place	5·42	Dalkeith	3·95
Charlotte Square.....	5·02	Smeaton	4·05
George Square...	5·46	Rosewell	4·52
Leith	5·49	Strathmiglo (Fife)	5·71

A notable feature of the rainfall of last month was the absence of any great downfall in twenty-four hours, the wettest day being the 22nd, when rather less than three-quarters of an inch fell. In the very wet November of 1770 no less than 2·30 inches fell on the 7th, 1·06 inches on the 9th, and 1·20 inches on the 14th—a total for three days of over 4½ inches. Again in 1772 nearly 2 ins. fell on the 1st of the month. The record November rainstorm occurred in 1795, when on the 18th of the month there fell 2·89 in. It will thus be seen that the Novembers of 1770, 1772 and 1795 were characterised by great and short-lived rainstorms; while the month that has just closed has been noteworthy for the steadiness and persistence of the rainfall, there having been only three dry days in many districts. The land has thus never had a chance to become dry, and its saturated condition may be imagined when we remember that the rainfall of 10·29 in. recorded in Edinburgh during the last two months, is equal to 1,039 tons, or 232,800 gallons of water per acre. Over the Edinburgh registration area of 8,804 acres, this amounts to 9,150,000 tons; while if we assume an average rainfall of 10 in., over the drainage area of the Pentland and Moorfoot Waterworks, we have a downfall of over forty-three millions of tons of water on the 42,577 acres covered by the combined systems.

R. C. MOSSMAN.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, JUNE, 1900.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Date.	Absolute. Minimum. Temp.	Date.	Average. Max.	Min.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Min. on Grass.	Total Rain. Depth.	Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
London, Camden Square	90·1	11	45·8	5	72·2	52·3	51·4	73	134·3	43·3	2·26	14	6·1
Malta	94·0	27	56·7	5	80·7	64·9	62·2	72	146·9	54·2	·38	4	1·9
Cape of Good Hope	77·9	29	37·9	9	65·9	49·8	51·9	81	...	...	1·57	9	4·9
Mauritius	79·5	6	53·0	29*a*	76·1	64·2	61·1	75	137·8	43·3	1·33	3	4·7
Calcutta	99·3	18	70·2	2	92·1	79·3	78·5	81	153·5	68·6	10·15	13	7·1
Bombay	93·4	8	75·0	25	90·3	81·6	77·8	78	141·2	72·7	18·26	13	6·6
Ceylon, Colombo	90·7	2, 3	72·0	25	87·4	78·5	75·7	84	148·0	71·0	7·83	21	6·7
Melbourne	67·5	4	36·4	12	57·5	44·1	44·3	81	121·4	29·9	1·76	11	6·3
Adelaide	66·0	3, 4	37·6	8	59·6	46·2	44·9	77	126·0	28·6	3·61	21	6·5
Sydney	67·1	3	43·7	30	60·4	51·5	47·2	85	107·9	33·0	10·48	20	6·1
Wellington	61·5	6	36·0	20	54·4	43·6	40·7	73	103·0	28·6	2·44	15	5·0
Auckland	64·0	3	44·0	20	59·4	48·7	42·7	66	125·0	38·0	3·10	16	5·5
Jamaica, Halfway Tree	92·0	26	70·6	1	87·9	72·3	71·4	78	...	...	3·58	9	4·3
Trinidad	...	...	...	...	...	...	...	...	...	...	...	...	...
Grenada	85·5	25	66·0	27	79·5	73·3	71·2	78	161·0	...	6·90	24	5·1
Toronto	89·4	24	44·4	30	76·5	54·6	55·1	71	109·6	38·8	2·43	9	4·0
New Brunswick, Fredericton	85·7	21	38·0	4	72·0	47·6	47·4	57	...	...	3·74	9	5·0
Manitoba, Winnipeg	100·5	23	33·0	8	81·4	51·2	...	...	...	...	1·85	10	4·5
Victoria, British Columbia	77·4	13	45·3	7	64·6	51·3	..	...	...	...	1·61	16	6·4

a—and 30.

REMARKS.

MALTA.—Adopted mean temp. 71°·8, or 0°·2 above average. Mean hourly velocity of wind 7·7 miles, or 1·1 below average. Mean temp. of sea 72°·3. TSS on 5th and 29th; L on 4th. J. F. DOBSON.

Mauritius.—Mean temp. of air 0°·1, and of dew point 0°·5, above average; rainfall ·61 in. below average. Mean hourly velocity of wind 9·2 miles, or 2·1 miles below average; extremes, 24·8 on 26th and 2·0 on 15th; prevailing direction S.E. by S. to E.S.E. T. F. CLAXTON.

CEYLON, COLOMBO.—Mean temp. of air 1°·0 above, of dew point 1°·6 above, and rainfall ·54 in. below, their respective averages. Mean hourly velocity of wind 11 miles; prevailing direction S.W. TSS on 7 days; L also on 18th and 19th. H. O. BARNARD.

Adelaide.—Good general rains fell in the latter half of the month. Mean temp. 0°·6 below the average for 43 years. Rain ·82 in. above average. C. TODD, F.R.S.

Sydney.—Temperature 1°·5 above, humidity 6·3 above, and rainfall 4·67 in. above, their respective averages. H. C. RUSSELL, F.R.S.

Wellington.—On the whole a showery month, although the total rain is below the average. Prevailing winds from S., frequently cold and frosty. Fogs on 8 days; T on 30th. Mean temp. equal to, and R 2·66 in. below, the average. R. B. GORE.

Auckland.—On the whole a showery month, but no heavy falls of rain, excepting one of 1·13 in. on the 26th. Mean temp. close to the average. Rainfall 1·50 in. below average. T. F. CHEESEMAN.

SUPPLEMENTARY TABLE OF RAINFALL, NOVEMBER, 1900.

Div	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
I.	Uxbridge, Harefield Pk..	2 31	XI.	Builth, Abergwesyn Vic.	6·67
II.	Dorking, Abinger Hall .	3·01	,,	Rhayader, Nantgwillt ...	5·46
,,	Birchington, Thor	2·33	,,	Lake Vyrnwy	5·92
,,	Hailsham	3·54	,,	Corwen, Rhug	4·56
,,	Ryde, Thornbrough	...	,,	Criccieth, Talarvor	4·76
,,	Emsworth, Redlands ...	3·06	,,	I. of Anglesey, Lligwy..	3·99
,,	Alton, Ashdell	3·04	,,	I. of Man, Douglas	5·97
III.	Oxford, Magdalen Coll..	1·71	XII.	Stoneykirk, Ardwell Ho.	5·66
,,	Banbury, Bloxham	2·01	,,	New Galloway, Glenlee	5·96
,,	Northampton, Sedgebrook	1·94	,,	Moniaive, Maxwelton Ho.	4·96
,,	Alconbury	...	,,	Lilliesleaf, Riddell	4·78
,,	Wisbech, Bank House...	2·17	XIII.	N. Esk Res. [Penicuick]	5·60
IV.	Southend	2·02	XIV.	Glasgow, Queen's Park..	6·20
,,	Colchester, Lexden	2·00	XV.	Inverary, Newtown	5·73
,,	Saffron Waldon, Newport	2·03	,,	Ballachulish, Ardsheal...	5·73
,,	Rendlesham Hall	2·31	,,	Islay	6·05
,,	Scole Rectory	...	XVI.	Dollar.....	5·77
,,	Swaffham	2·73	,,	Balquhidder, Stronvar...	6·59
V.	Salisbury, Alderbury ...	3·10	,,	Coupar Angus Station...	3·86
,,	Bishop's Cannings	2·70	,,	Blair Atholl	3·56
,,	Blandford, Whatcombe .	4·26	XVII.	Keith H.R.S.....	3·03
,,	Ashburton, Holne Vic...	5·79	,,	Forres H.R.S.	2·47
,,	Okehampton, Oaklands.	5·55	XVIII.	Fearn, Lower Pitkerrie..	3·03
,,	Hartland Abbey	6·00	,,	S. Uist, Askernish	3·59
,,	Lynton, Glenthorne ...	6·15	,,	Invergarry.....	3·58
,,	Probus, Lamellyn	5·61	,,	Aviemore, Alvie Manse.	2·48
,,	Wellington, The Avenue	4·08	,,	Loch Ness, Drumnadrochit	3·41
,,	North Cadbury Rectory	2·81	XIX.	Invershin	4·38
VI.	Clifton, Pembroke Road	2·90	,,	Durness.....	5·14
,,	Ross, The Graig	2·18	,,	Watten H.R.S.....	3·09
,,	Wem, Clive Vicarage ...	2·86	XX.	Dunmanway, Coolkelure	10·11
,,	Wolverhampton, Tettenhall	2·45	,,	Cork, Wellesley Terrace	4·52
,,	Cheadle, The Heath Ho.	3·19	,,	Killarney, Woodlawn ..	8·11
,,	Coventry, Priory Row ..	2·15	,,	Caher, Duneske	...
VII.	Market Overton	2·30	,,	Ballingarry, Hazelfort...	4·15
,,	Grantham, Stainby	1·87	,,	Limerick, Kilcornan ...	4·81
,,	Horncastle, Bucknall ...	1·64	,,	Miltown Malbay	5·66
,,	Worksop, Hodsck Priory	1·93	XXI.	Gorey, Courtown House	7·22
VIII.	Neston, Hinderton	3·04	,,	Moynalty, Westland ...	6·00
,,	Southport, Hesketh Park	3·13	,,	Athlone, Twyford	4·52
,,	Chatburn, Middlewood.	3·78	,,	Mullingar, Belvedere ...	5·07
,,	Duddon Val., Seathwaite Vic.	9·40	XXII.	Woodlawn	4·62
IX.	Melmerby, Baldersby ...	3·19	,,	Crossmolina, Enniscoe ..	6·64
,,	Scalby, Silverdale	2·88	,,	Collooney, Markree Obs.	4·90
,,	Ingleby Greenhow Vic..	3·40	XXIII.	Enniskillen, Model Sch.	...
,,	Middleton, Mickleton ...	3·76	,,	Warrenpoint.....	5·94
X.	Haltwhistle, Unthank H.	5·24	,,	Seaforde.....	6·06
,,	Bamburgh	4·00	,,	Belfast, Springfield	5·53
,,	Keswick, The Bank	4·58	,,	Bushmills, Dundarave..	5·63
XI.	Llanfrechfa Grange	4·26	,,	Stewartstown	5·67
,,	Llandovery	3·93	,,	Killybegs	8·22
,,	Castle Malgwyn	5·04	,,	Horn Head	6·14
,,	Brecknock, The Barracks	...			

NOVEMBER, 1900.

Div.		STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL. Total Fall.	Difference from average 1880-9.	Greatest Fall in 24 hours. Dpth	Date	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Date	Min. Deg.	Date.	No. of Nights below 32°. In shade.	On grass.
			inches.	inches.	in.								
I.	ENGLAND.	London (Camden Square) ...	1·90	— ·76	·41	16	18	62·0	1	28·3	11	2	10
II.		Tenterden	2·99	— ·40	·57	15	18	62·0	1	31·0	11	2	4
,,		Hartley Wintney	1·86	...	·24	28	20	63·0	1	30·0	23	5	9
III.		Hitchin	1·93	— ·75	·38	24	20	60·0	1	27·0	10	4	...
,,		Winslow (Addington)	2·04	— ·89	·31	24	23	61·0	1	21·0	11	4	7
IV.		Bury St. Edmunds (Westley)	2·19	— ·36	·35	1	19	60·0	1	30·0	10	...	...
,,		Norwich (Brundall)	2·17	...	·33	12	25	60·6	1	28·0	11	2	13
V.		Winterbourne Steepleton ...	5·08	...	·81	28	21	59·4	2	28·0	23	3	13
,,		Torquay (Cary Green)	2·84	...	·45	5	20	62·2	4	33·9	11	0	6
,,		Polapit Tamar [Launceston]..	5·73	+ 1·39	1·30	6	21	59·5	4	24·5	22	8	11
VI.		Stroud (Upfield)	2·21	— 1·12	·34	24	21	60·0	1	30·0	10	1	...
,,		Church Stretton (Woolstaston)	3·24	— ·28	·56	6*a*	25	59·0	2	31·5	19	2	9
,,		Worcester (Diglis Lock)	2·16	— ·68	·31	6*b*	23	...	...	...	...	...	...
VII.		Boston	1·82	— ·38	·26	5	18	60·0	1	26·0	11	4	...
,,		Hesley Hall [Tickhill].....	2·14	+ ·12	·33	12	19	54·0	2	29·0	24	3	...
,,		Breadsall Priory	2·65	...	·40	6	24	...	...	...	...	...	...
VIII.		Manchester(PlymouthGrove)	2·10	— ·90	·35	3	17	65·0	1	30·0	22	2	5
IX.		Wetherby (Ribston Hall) ...	4·00	+ 1·93	·60	28	25	...	...	...	...	...	...
,,		Skipton (Arncliffe)	6·91	+ ·16	·83	12	27	...	...	...	...	...	...
,,		Hull (Pearson Park).	2·67	+ ·66	·34	4	22	60·0	1	29·0	11	2	9
X.		Newcastle (Town Moor)	2·87	+ ·47	·55	3	21	...	...	...	...	...	...
,,		Borrowdale (Seathwaite).....	9·96	— 4·83	1·53	8	21	58·5	1	27·4	19	3	...
XI.	WALES.	Cardiff (Ely).....	5·20	+ ·29	·65	24	23	...	...	...	...	...	...
,,		Haverfordwest	5·16	— ·70	·89	24	21	58·2	1	27·2	21	3	15
,,		Aberystwith (Gogerddan) ...	5·70	+ ·59	1·21	24	20	57·0	1	...	...	...	...
,,		Llandudno.....	3·66	+ ·57	·75	24	19	59·0	1	31·5	19	1	...
XII.	SCOTLAND.	Cargen [Dumfries]	4·83	+ ·27	·71	3	19	59·0	1	26·0	19	3	...
XIII.		Edinburgh (Blacket Place)...	5·42	...	...	...	...	56·5	...	29·0	...	...	...
XIV.		Colmonell	4·62	...	·78	3	14	63·0	1	25·0	17*g*	...	..
XV.		Tighnabruaich	7·57	...	1·08	26	17	52·0	1, 6	28·0	17*g*	6	...
,,		Mull (Quinish).....	6·36	— ·63	1·20	5	17	...	...	...	...	...	...
XVI.		Loch Leven Sluices	5·80	+ 1·84	·60	1*c*	18	...	...	...	...	...	...
,,		Dundee (Eastern Necropolis)	4·60	+ 1·90	·65	26	23	57·4	1	26·2	19	6	...
XVII.		Braemar	...	...	...	...	...	...	...	...	...	...	...
,,		Aberdeen (Cranford)	5·10	...	1·12	15	28	63·0	1	26·0	27	10	...
,,		Cawdor (Budgate)	3·39	+ ·54	·99	6	17	...	...	...	...	...	...
XVIII		Strathconan [Beauly]	5·21	— 1·35	1·50	12	11	...	...	...	...	...	...
,,		Glencarron Lodge.....	5·56	...	1·02	6	21	58·6	1, 3	26·6	20	7	...
XIX.		Dunrobin	4·34	+ 1·51	1·10	8	16	54·0	1	30·0	28	5	...
,,		S. Ronaldshay (Roeberry) ...	3·66	+ ·24	·65	6*d*	26	54·0	1	34·0	17	0	...
XX.	IRELAND.	Darrynane Abbey.....	7·53	...	1·11	21	24	...	...	...	...	...	...
,,		Waterford (Brook Lodge) ...	7·43	+ 3·76	1·00	6	19	59·0	1	26·0	21	6	...
,,		Broadford (Hurdlestown) ...	4·88	...	·77	27	23	...	...	...	...	...	...
XXI.		Carlow (Browne's Hill)	9·26	+ 6·20	2·14	6	21	...	...	...	...	...	...
,,		Dublin (FitzWilliam Square)	4·87	+ 2·04	1·13	27	19	62·8	3	32·0	22	1	7
XXII.		Ballinasloe	4·90	+ ·99	·64	5	26	57·0	2*e*	22·0	19	12	...
,,		Clifden (Kylemore)	6·39	...	...	...	...	...	...	...	...	...	...
XXIII		Waringstown	5·13	+ 2·03	·90	24	16	59·0	5*f*	25·0	18	15	22
,,		Londonderry (Creggan Res.).	4·85	+ ·33	·58	6	22	...	...	...	...	...	...
,,		Omagh (Edenfel)	6·55	+ 2·68	1·32	27	17	58·0	1	23·0	21	12	14

+ Shows that the fall was above the average ; — that it was below it.

a—and 28. *b*—and 12, 27. *c*—and 4, 15. *d*—and 26. *e*—and 3, 4, 5. *f*—and 6, 7, 8, 9. *g*—and 18.

METEOROLOGICAL NOTES ON NOVEMBER, 1900.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; TS for Thunderstorm; R for Rain; H for Hail; S for Snow.

ENGLAND.

TENTERDEN.—Rainfall again below the average, but it was the wettest month since February. Mean temp. 46°. Duration of sunshine only 45 hours 30 mins. Distant L in the evening on 10th. Swallows were seen as late as the 7th. On the 22nd the depth of water in the well was the same as a year ago, only 16 inches.

HARTLEY WINTNEY.—Although R fell on two-thirds of the days of the month, the amount was less than the average by ·11 in. There were many calm and mild days. An absence of frost, and no fog until the 23rd. Ozone occurred on 8 days, with a mean of 4·4 On the 10th the duration of sunshine was 6 hours, and on the 26th 5 hours.

WINSLOW, ADDINGTON.—A dull and damp month, with very little fog, but R on many days. The only sharp frost was on the 11th, when all tender outdoor plants were destroyed. Distant T on 14th.

BURY ST. EDMUNDS, WESTLEY.—A dull, mild and dreary month, with very little frost.

NORWICH, BRUNDALL.—An exceedingly damp and gloomy month, but very mild. Mean temp. nearly 3°·0 above the average, making the fourth very mild November in succession. Fog on 2nd; L on 15th; gale from N. on 17th.

WINTERBOURNE STEEPLETON.—A wet month, but not unusually so for November. The weather kept very open, and there was but little frost.

TORQUAY, CARY GREEN.—R 1·10 in. below the average; mean temp. 0°·7 above the average. Duration of sunshine, 87 hours 10 mins.; 6 sunless days. Ozone mean, 5·3, the max. being 7·0 on 25th and 26th.

POLAPIT TAMAR [LAUNCESTON].—A cold, dull and wet month. Fog on 3rd and 21st. H on 9th, 10th, and 15th. For the 11 months of the year the rainfall exceeds the average by 2·33 in.

WALES.

HAVERFORDWEST.—A wet, mild month, with very little sunshine. From the 18th to 23rd it was colder, the min. on grass on 19th being 17°·3. The total R for the 11 months of the year is slightly below the average.

ABERYSTWITH, CROGERDDAN.—A very wet month; mild, with very little sunshine.

SCOTLAND.

CARGEN [DUMFRIES].—A wet and sunless month. Strong westerly gale on the 8th.

EDINBURGH, BLACKET PLACE.—The wettest November since at least 1785; the R was exceeded in November in 1770 with 6·78 in., and in 1772 with 5·66 in. Duration of sunshine, only 22 hours.

CLACHANTON, COLMONELL.—R ·55 in. below, and mean temp. (43°·5) 2°·1 above, the average of 24 years.

TIGHNABRUAICH, CRAIGANDARAICH.—A cold and wet month; the prevailing winds were from E. and N.E.

ABERDEEN, CRANFORD.—It was admitted by the "oldest inhabitants" that such continuous wet weather had never been seen before. Sickness was very prevalent, especially among the young.

S. RONALDSHAY, ROEBERRY.—A very fair month upon the whole. No heavy gales. Mean temp. 43°·5, or 0°·1 above the average.

IRELAND.

DARRYNANE ABBEY.—A wet month, especially the last twelve days, 4·78 in. of R falling in the eight days from 21st to 28th, or an average of ·60 in. per day. H showers on the 8th and 9th. On the 21st 1·11 in. of R fell in less than 15 hours.

WATERFORD, BROOK LODGE.—The first S fell on the Comeragh Mountains on the 10th, and more fell on the 29th.

BROADFORD, HURDLESTOWN.—A very wet month. R 1·50 in., and rainy days 3, above the average of 16 years. Dense fog on 4th.

CARLOW, BROWNE'S HILL.—During the 36 years that a record has been kept here, there never was so great an amount of R for one month, and only once a heavier fall in 24 hours than that of 2·14 in. on 6th.

DUBLIN, FITZWILLIAM SQUARE.—In the main dull, damp and foggy, with excessive R. At the beginning the temp. was uncommonly high. In an anticyclonic period, from 17th to 20th, and for some days subsequently, it was cold, with much fog and dampness. The closing days were extremely unsettled, gloomy and rainy. Mean temp. 45°·6, or 0°·9 above the average. High winds were noted on 10 days, attaining the force of a gale on 27th and 28th. More or less fog on 9 days.

OMAGH, EDENFEL.—The weather till the 16th was dull, raw and gloomy, with saturating rains, when there followed a dry and cold period until the 24th, with frosts more or less severe every night, but no S. The last week was again extremely wet, 2·65 in. of R falling on four wet days, bringing the total of the month to nearly twice the average, and that of October and November together to 12·68 in.